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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/585,496	10/30/2006	Yuriy Mikhaylik	57519.00174	4184

7590 06/11/2010  
Squire Sanders & Dempsey  
Two Renaissance Square  
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EXAMINER
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WEINER, LAURA S

ART UNIT	PAPER NUMBER
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1795

MAIL DATE	DELIVERY MODE
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06/11/2010

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/585,496	<b>Applicant(s)</b> MIKHAYLIK, YURIY	
	<b>Examiner</b> /Laura S. Weiner/	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 03 May 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 12-14 and 26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11, 15-25 and 27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)         | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election of an electrolyte species comprising inorganic nitrates and a solvent comprising of dimethoxyethane and dioxolane in the reply filed on 5-3-2010 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

2. Claims 12-14 and 26 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 5-3-2010.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

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the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1- 11, 15, 17-25 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Furukawa et al. (5,112,704).

Furukawa et al. teaches in column 5, Example, a cell comprising a negative electrode formed of lithium metal, a positive electrode, a separator and an electrolyte comprising 1 mol/lit  $\text{LiCF}_3\text{SO}_3$  dissolved in a solvent mixture of ethylene carbonate, butylene carbonate and 1,2-dimethoxyethane. Furukawa et al. teaches in columns 10-11, Example, a cell comprising a negative electrode formed of lithium metal, a positive electrode and an electrolyte comprising 1 mol/lit  $\text{LiCF}_3\text{SO}_3$  dissolved in a solvent mixture of propylene carbonate and 1,2-dimethoxyethane and 1 g/lit lithium nitrate ( $\text{LiNO}_3$ ). Furukawa et al. teaches in column 14, claim 1, that the positive electrode comprises  $\text{MnO}_2$ ,  $\text{FeS}$ ,  $\text{TiS}_2$ ,  $\text{MoS}_2$ , etc.

Since Furukawa et al. teaches the same electrochemical cell comprising a positive electrode which contains an electroactive sulfur containing material, a negative electrode comprising lithium, a separator and an electrolyte comprising an inorganic nitrate, a lithium nitrate, a solvent comprising dimethoxyethane and dioxolane and a lithium salt such as  $\text{LiN}(\text{CF}_3\text{SO}_2)_2$  or  $\text{LiCF}_3\text{SO}_2$ , then inherently the same battery utilizing the electroactive sulfur-containing material of at least 60% and a charge-discharge efficiency of at least 80% over at least 10 cycles at a charge rate of 0.2 mA/cm<sup>2</sup> and a discharge rate of 0.4 mA/cm<sup>2</sup> must also be obtained.

In addition, the presently claimed property of a battery utilizing the electroactive sulfur-containing material of at least 60% and a charge-discharge efficiency of at least

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80% over at least 10 cycles at a charge rate of 0.2 mA/cm<sup>2</sup> and a discharge rate of 0.4 mA/cm<sup>2</sup> would have obviously have been present once the Furukawa et al. product is provided. *In re Best*, 195 USPQ 433 (CCPA 1977).

6. Claims 1-11, 15, 17-25 and 27 rejected under 35 U.S.C. 103(a) as being unpatentable over Furukawa et al. (5,112,704) in view of Jung et al. (US 2002/0045102).

Furukawa et al. teaches as explained above in column 5, Example, a cell comprising a negative electrode formed of lithium metal, a positive electrode, a separator and an electrolyte comprising 1 mol/lit LiCF<sub>3</sub>SO<sub>3</sub> dissolved in a solvent mixture of ethylene carbonate, butylene carbonate and 1,2-dimethoxyethane.

Furukawa et al. teaches in columns 10-11, Example, a cell comprising a negative electrode formed of lithium metal, a positive electrode and an electrolyte comprising 1 mol/lit LiCF<sub>3</sub>SO<sub>3</sub> dissolved in a solvent mixture of propylene carbonate and 1,2-dimethoxyethane and 1 g/lit lithium nitrate (LiNO<sub>3</sub>). Furukawa et al. teaches in column 14, claim 1, that the positive electrode comprises MnO<sub>2</sub>, FeS, TiS<sub>2</sub>, MoS<sub>2</sub>, etc.

Furukawa et al. discloses the claimed invention teaching an electrolyte comprising 1, 2-dimethoxyethane but does not teach an electrolyte comprising dimethoxyethane and dioxolane.

Jung et al. teaches in [0013], a battery comprising a negative electrode comprising lithium and a positive electrode comprising a sulfur-based compound. Jung et al. teaches [0040], a positive electrode comprising elemental sulfur, a negative electrode

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comprising lithium, a separator and an electrolyte comprising 1 M  $\text{LiSO}_3\text{CF}_3$  in dimethoxyethane/sulfolane/1,3-dioxolane.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use dimethoxyethane, dioxolane and sulfolane instead of dimethoxyethane as the solvent because Jung et al. teaches that both these solvents can be used as an electrolyte solvent of a battery comprising a sulfur cathode, a lithium anode and an electrolyte comprising  $\text{LiSO}_3\text{CF}_3$  as explained above and one would expect therefore that these solvent materials would function in a similar way and give similar results.

7. Claims 1-11, 15-25 and 27 rejected under 35 U.S.C. 103(a) as being unpatentable over Furukawa et al. (5,112,704) in view of Yokoyama et al. (5,580,684).

Furukawa et al. teaches as explained above in column 5, Example, a cell comprising a negative electrode formed of lithium metal, a positive electrode, a separator and an electrolyte comprising 1 mol/lit  $\text{LiCF}_3\text{SO}_3$  dissolved in a solvent mixture of ethylene carbonate, butylene carbonate and 1,2-dimethoxyethane.

Furukawa et al. teaches in columns 10-11, Example, a cell comprising a negative electrode formed of lithium metal, a positive electrode and an electrolyte comprising 1 mol/lit  $\text{LiCF}_3\text{SO}_3$  dissolved in a solvent mixture of propylene carbonate and 1,2-dimethoxyethane and 1 g/lit lithium nitrate ( $\text{LiNO}_3$ ). Furukawa et al. teaches in column 14, claim 1, that the positive electrode comprises  $\text{MnO}_2$ ,  $\text{FeS}$ ,  $\text{TiS}_2$ ,  $\text{MoS}_2$ , etc.

Furukawa et al. discloses the claimed invention teaching an electrolyte comprising

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1, 2-dimethoxyethane and  $\text{LiCF}_3\text{SO}_3$  but does not teach an electrolyte comprising dimethoxyethane and dioxolane and/or  $\text{LiN}(\text{CF}_3\text{SO}_2)_2$ .

Yokoyama et al. teaches in column 1, that electrolyte solutions comprise a mixture of solvents of high dielectric constant such as propylene carbonate, gamma-butyrolactone, etc. and solvents of low viscosity such as dimethoxyethane and 1,3-dioxolane and an electrolyte such as  $\text{LiCF}_3\text{SO}_3$  or  $\text{LiN}(\text{CF}_3\text{SO}_2)_2$ . Yokoyama et al. teaches in column 6, lines 35-50, that the negative electrode comprises lithium and the positive electrode comprises  $\text{MoS}_2$ ,  $\text{TiS}_2$ , etc.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use dimethoxyethane and dioxolane instead of dimethoxyethane as the solvent because Yokoyama et al. teaches that both these solvents can be used as an electrolyte solvent of a battery comprising a sulfur cathode, a lithium anode and an electrolyte comprising  $\text{LiCF}_3\text{SO}_3$  as explained above and one would expect therefore that these solvent materials would function in a similar way and give similar results.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use  $\text{LiN}(\text{CF}_3\text{SO}_2)_2$  instead of  $\text{LiCF}_3\text{SO}_3$  as the lithium salt because Yokoyama et al. teaches that both these salts can be used in an electrolyte of a battery comprising a sulfur cathode, a lithium anode and an electrolyte comprising  $\text{LiCF}_3\text{SO}_3$  as explained above and one would expect therefore that these lithium salts would function in a similar way and give similar results.

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8. Claims 1-11, 15-25 and 27 rejected under 35 U.S.C. 103(a) as being unpatentable over Furukawa et al. (5,112,704) in view of Webber (6,218,054).

Furukawa et al. teaches as explained above in column 5, Example, a cell comprising a negative electrode formed of lithium metal, a positive electrode, a separator and an electrolyte comprising 1 mol/lit  $\text{LiCF}_3\text{SO}_3$  dissolved in a solvent mixture of ethylene carbonate, butylene carbonate and 1,2-dimethoxyethane.

Furukawa et al. teaches in columns 10-11, Example, a cell comprising a negative electrode formed of lithium metal, a positive electrode and an electrolyte comprising 1 mol/lit  $\text{LiCF}_3\text{SO}_3$  dissolved in a solvent mixture of propylene carbonate and 1,2-dimethoxyethane and 1 g/lit lithium nitrate ( $\text{LiNO}_3$ ). Furukawa et al. teaches in column 14, claim 1, that the positive electrode comprises  $\text{MnO}_2$ ,  $\text{FeS}$ ,  $\text{TiS}_2$ ,  $\text{MoS}_2$ , etc.

Furukawa et al. discloses the claimed invention teaching an electrolyte comprising 1, 2-dimethoxyethane and  $\text{LiCF}_3\text{SO}_3$  but does not teach an electrolyte comprising dimethoxyethane and dioxolane and/or  $\text{LiN}(\text{CF}_3\text{SO}_2)_2$ .

Webber teaches in column 2, an electrochemical cell comprising an electrolyte consisting essentially of dioxolane solvent and dimethoxyethane solvent. Webber teaches in column 3, that the anode comprises lithium, the cathode comprises iron sulfides and the salt comprises  $\text{LiCF}_3\text{SO}_3$  or  $\text{LiN}(\text{CF}_3\text{SO}_2)_2$ .

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use dimethoxyethane and dioxolane instead of dimethoxyethane as the solvent because Webber teaches that both these solvents can be used as an electrolyte solvent of a battery comprising a sulfur cathode, a lithium



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anode and an electrolyte comprising  $\text{LiCF}_3\text{SO}_3$  as explained above and one would expect therefore that these solvent materials would function in a similar way and give similar results.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use  $\text{LiN}(\text{CF}_3\text{SO}_2)_2$  instead of  $\text{LiCF}_3\text{SO}_3$  as the lithium salt because Webber teaches that both these salts can be used in an electrolyte of a battery comprising a sulfur cathode, a lithium anode and an electrolyte comprising  $\text{LiCF}_3\text{SO}_3$  as explained above and one would expect therefore that these lithium salts would function in a similar way and give similar results.

### ***Double Patenting***

9. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

10. Claims 1-7, 9-11, 15-17, 21-22, 25 and 27 are rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 27-29, 32-33, 37-39 of prior U.S. Patent No. 7,358,012. This is a double patenting rejection.

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11. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

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12. Claims 1-11, 15-25, and 27 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-2, 4-9, 11-13, 15-16, 18, 20-23, 26-32, 34-36, 39-42 and 45 of U.S. Patent No. 7,354,680. Although the conflicting claims are not identical, they are not patentably distinct from each other because U.S. Patent No. 7,354,680 claims in claims a cell comprising a cathode comprising an electroactive sulfur-containing material; a lithium anode; and an electrolyte comprising one or more nonaqueous solvents selected from acyclic ethers, cyclic ethers, polyethers or sulfones; one or more lithium salts and one or more N-O additives comprises an inorganic nitrite and one or more inorganic nitrates and lithium salts such as  $\text{LiCF}_3\text{SO}_3$  or  $\text{LiN}(\text{CF}_3\text{SO}_2)_2$ . U.S. Patent No. 7,354,680 claims in claim 9 that the cyclic ether is dioxolane and claims in claim 18, that the solvents consist of dimethoxyethane and dioxolane.

13. Claims 1-11, 15-25 and 27 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 27-41 of U.S. Patent No. 7,358,012. Although the conflicting claims are not identical, they are not patentably distinct from each other because U.S. Patent No. 7,358,012 claims in claims a cell comprising a cathode comprising an electroactive sulfur-containing material; a lithium anode; and an electrolyte comprising one or more nonaqueous solvents selected from acyclic ethers, cyclic ethers, polyethers or sulfones; one or more lithium salts and one or more N-O additives comprising specifically lithium nitrate and lithium salts such as  $\text{LiCF}_3\text{SO}_3$  or  $\text{LiN}(\text{CF}_3\text{SO}_2)_2$  wherein the cell exhibits utilization of the electroactive

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sulfur-containing material of at least 60% and a charge-discharge efficiency of at least 80% over at least 10 cycles at a charge rate of 0.2 mA/cm<sup>2</sup> and a discharge rate of 0.4 mA/cm<sup>2</sup>. U.S. Patent No. 7,358,012 claims in claim 39, that the solvents consist of dimethoxyethane and dioxolane.

### ***Specification***

14. The disclosure is objected to because of the following informalities: The amendment filed 5-3-2010 updating Page 1, Cross Reference to Related Applications is incorrect because it states that "PCT/US05/00494 filed ..., which claims priority to U.S. Patent Application No. 10/753,031". A PCT cannot claim priority to a US Patent Application. The Examiner believes that it should be written as "PCT/US05/00494 filed ..., which is a CON to U.S. Patent Application No. 10/752,031, filed January 6, 2004, now US Patent 7,358,012".

Appropriate correction is required.

### ***Oath/Declaration***

15. There seems to be an issue with how the Declaration states that PCT/US2005/000494 is a prior foreign application and 10/753,031 is a U.S Patent application before the PCT was filed. The continuation data is being shown as "This application is a 371 of PCT/US05/00494" and under Foreign application is "UNITED STATES OF AMERICA 10/753031".

Any inquiry concerning this communication or earlier communications from the examiner should be directed to /Laura S. Weiner/ whose telephone number is 571-272-1294. The examiner can normally be reached on M-H (6:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Laura S Weiner/  
Primary Examiner  
Art Unit 1795

June 2, 2010